***BTEC Firsts (Level 2) in Applied Science***

***UNIT*** *3* ***ASSIGNMENT*** *1 – Criteria P1 & D1*

***Assignment Title:*** *The Genetic Code*

***Student Name: Teacher:***

***Date assignment issued: Final Completion Date:***

**Introduction**

In order to finish this unit you need to complete 6 assignments in total. To make sure you finish on time and meet all your deadlines the assignment has been broken down into tasks and will be spaced over the course.

Each task will start with the part of the grading criteria that the task relates to, example P1, P2 or P3. It will finish with a deadline for the task to be completed by.

**Overview:**

Learners will look at how organisms function, including cells and how they are organised into tissues. Learners will look at how genes control cell activities (in particular cellular products) which may then influence the development of the whole organism.

**The learning outcomes for the unit:**

To be able to investigate the functioning and classification of organisms

**Brief**

This assignment is about to take you on an exciting journey to the world of DNA, genes and chromosomes.

[Forensic scientists](http://en.wikipedia.org/wiki/Forensic_science) can use DNA in [blood](http://en.wikipedia.org/wiki/Blood), [semen](http://en.wikipedia.org/wiki/Semen), [skin](http://en.wikipedia.org/wiki/Skin), [saliva](http://en.wikipedia.org/wiki/Saliva) or [hair](http://en.wikipedia.org/wiki/Hair) at a crime scene to identify a perpetrator. This process is called [genetic fingerprinting](http://en.wikipedia.org/wiki/Genetic_fingerprinting), or more accurately, DNA profiling.

DNA profiling is used in paternity cases to decide who is the father of a child is.

Medical professionals use DNA profiling to identify and treat inherited diseases. A genetic disorder is a disease or condition caused by abnormalities in [genes](http://en.wikipedia.org/wiki/Gene) or [chromosomes](http://en.wikipedia.org/wiki/Chromosome).

**So .... how much do you really know?**

Some questions for you to ponder?

* How many chromosomes do you have?
* How many chromosomes are there in a sex cell?
* Can you explain the reason for the difference in number of chromosomes in a normal human lung cell and a normal human sex cell?
* Can you draw the structure of the chromosomes?

**Scenario:**

You are a Public Liaison Officer working for the Sanger Institute and who needs to communicate the science behind Genes, DNA and Chromosomes to visitors.

***Task 1***

Explaining Genes, DNA and Chromosomes to the Public

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| **Working on P1**  **Grading Criteria:**  “Describe how the functioning  of organisms relates to the  genes in their cells” | Describe how genes code for proteins.  Describe how the cell function is related to the proteins that different genes make.  Give 5 examples of different proteins and their functions e.g. intracellular enzymes | **Deadline for Task** |

***Task 2***

How genes control variation within a species using a simple coded message

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| **Working on**  **D1**  **Grading Criteria:**  “Explain how genes control variation within a species brings about evolutionary change”. | Write a 500 word explanation of how genes control variation using a simple code which brings about an evolutionary change.  Include: the triplet code and how it leads to translation to produce a protein; how genes control variation within the species by linking the triplet code in DNA to the production of different proteins in cells.  E.g. – How have changes in genes in peppered moths allowed them to adapt to their environment? | **Deadline for Task 2:** |

**Self Assessment Checklist**

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| **Task** | **What you will have produced** | **Deadline** |
| **1 linked to P1** | * Poster to explain how DNA, chromosomes and Genes are related and where they are found   **(POSTER)** |  |
| **2 linked**  **to D1** | Write a 500 word explanation of how genes control variation using a simple code which brings about an evolutionary change.  **(ESSAY)** |  |

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| **Resource list** | |
| Websites:   * <http://learn.genetics.utah.edu/> * [www.bbc.bitesize.co.uk](http://www.bbc.bitesize.co.uk) * [www.schoolscience.co.uk](http://www.schoolscience.co.uk) * <http://www.sciencemuseum.org.uk/WhoAmI/FindOutMore/Yourgenes.aspx> * [www.societyofbiology.org.uk](http://www.societyofbiology.org.uk) * [www.practicalbiology.org](http://www.practicalbiology.org) | Text books   * Biology for you * Edexcel 360 - Core and additional * 21st Century Science Biology textbook |

**Final things:**

* + Page number your portfolio (make sure it is all in the correct order)
  + Include a bibliography stating all your sources
  + Use appendices to store any additional information e.g. your screen dumps or newspaper articles
  + Make sure you create your own front cover with your name, the BTEC details and the unit details plus your teacher’s name.